REMARKS

Claims 8-12 are pending in this application. For purposes of expedition, claims 1-7 have been canceled without prejudice or disclaimer. However, dependent claim 8 has been amended to incorporate all limitations of its base claim 6 (now canceled) and intervening claim 7 (now canceled) in an effort to expedite compact prosecution of the instant application and to place all claims 8-12 in condition for allowance. Claims 9-11 have been amended to ensure proper antecedent basis with base claim 8 and avoid §112 issues.

As a preliminary matter, the Examiner notes that the current status of prior application Serial No. 10/326,978 needs to be updated. In response thereto, the specification has been amended to update the status of prior application Serial No. 10/326,978, as now issued as U.S. Patent No. 6,721,841.

The abstract of the disclosure has been objected to the term "I/O subsystem A for open system" and the term "I/O subsystem B for a main frame" are not consistently used. In response thereto, the abstract has been amended in those instances to overcome the objection.

Claims 1-5 and 6-12 have been objected to because of several informalities kindly indicated on pages 2-3 of the Office Action (Paper No. 20040607). As previously discussed, for purposes of expedition, claims 1-7 have been canceled without prejudice or disclaimer to render the objection moot. Base claim 8 has been rewritten in independent form to differentiate a write request issued from a host computer versa a write request issued from a first disk controller to avoid the problem raised by the Examiner.

Claims 11-12 have been rejected under 35 U.S.C. §112, 1st ¶, as failing to comply with the written description requirement. Specifically, the Examiner asserts that there is no support in the specification for the second disk controller to have an interface for coupling to the host computer, and the first disk controller being coupled to the second disk controller via the same type of interface as the interface for coupling to the host computer. In response thereto, claim 11 has been amended to overcome the rejection.

Claims 1-11 have been rejected under 35 U.S.C. §102(b) as being anticipated by Beal et al., U.S. Patent No. 5,155,845 for reasons stated on pages 4-7 of the Office Action (Paper No. 20040607). While Applicants disagree with the Examiner's assessment of Beal '845, claims 1-7 have been canceled without prejudice or disclaimer for purposes of expedition in favor of early allowance of claims 8-12. As previously discussed, claim 8 has been rewritten in independent form to include all limitations of base claim 6 and intervening claim 7, and make express reference to the "correlation information" used to control data storage, in order to place in condition for allowance.

For example, claim 8, as amended, now a storage system comprising:

> a first storage system comprising a first disk controller and at least one first disk coupled to said first disk controller; a first disk controller coupled to a host computer, a processor, and another storage system, said another storage system comprising a second disk controller and at least one second disk coupled to said second disk controller; and
>
> at least one first disk coupled to said first disk controller,
>
> wherein said first disk controller includes a memory in which correlation information among first disk identification information, identification information designating said another storage system, and second disk identification is stored, said correlation information being set in said first disk controller by said processor coupled to said first disk controller; and

> wherein said first disk controller is configured to receive a write request from said host computer, select a storage system including a target disk corresponding to first disk identification information included in the write request by using said correlation information, obtain, if a selected storage system is said another storage system, identification information designating said another storage system and second disk identification information designating one of said at least one second disk based on said first disk identification information and said correlation information, and send a write request to said another storage system according to said identification information designating said another storage system and said second disk identification information.

As expressly defined in Applicants' base claim 8, a storage system comprising a first disk controller and at least one first disk, is coupled to a host computer, a processor and another storage system comprising a second disk controller and at least one second disk, in which the first disk controller includes a memory used to store "correlation information" [among first disk identification information, identification information designating a storage system, and second disk identification information] set in the first disk controller from the processor.

Upon receipt of a write request from the host computer, the first disk controller selects a storage system having the target disk by using first disk identification information and correlation information included in the write request. If the selected storage system is another storage system, then the first disk controller obtains identification information for identifying said another storage system and second disk identification information based on the first disk identification information and correlation information contained in the write request, and sends the write request to another storage system according to the identification information designating said another storage system and second disk identification information.

Here, the correlation information used for selecting a storage system having the target disk is set in the first disk controller from the processor, and **not** the host computer which issues the write request. As a result, the host computer needs **not** know as to which one of the storage systems has the target disk intended by the write request which the host computer issues. This is because the storage system in which the target disk is actually present is determined by the "correlation information" set in the first disk controller by the processor, and **not** the host computer. Therefore, the first disk controller of a storage system can advantageously deliver a write request to another storage system (or any other storage systems) transparently with respect to the host computer (i.e., without making the host computer aware which one of the storage systems the target disk intended by the write request is present).

In contrast to Applicants' base claim 8, Beal '854 discloses a known technique for transmitting and receiving data between I/O subsystems, in which data back-up and other functions are independently operated and managed, as expressly acknowledged in the BACKGROUND section of Applicants' disclosed invention. Specifically, Beal '854 describes a host 101, as shown in FIG. 1 or FIG. 2, connected to a data storage controller (DSC) 105 which is interconnected to other DSC 107, or alternatively, multiple hosts 101, 121, as shown in FIG. 3 or FIG. 4, connected to multiple DSCs 105, 107, equipped for the provision of Extended Dual Copy Service and, as an extended version thereof, Extended Connectivity Service in which data is written in either drives 109 belong to DSC 105 or drives 111 belonging to DSC 107. Extended Dual Copy Service is a service in which two copies are made in both storage systems. For example, as shown in FIG. 4, when host 101 issues a write

command to DSC 105, associated write data is stored **not** only in drive 109 belonging to DSC 105, but also in drive 111 belonging to DSC107. In addition, the system of FIG. 4 may be configured such that, when host 101 issues a write command to DSC 105, write data is **not** written in drive 109 under DSC 105, but is written only in drive 111 under DSC 107, as described on col. 8, lines 14-21 and col. 30, lines 20-35 of Beal '845.

In order to provide such an Extended Dual Copy Service, it is first necessary for the host 101 to issue a command sequence, as shown in FIG. 14, to DSC 105 to instruct preparatory actions for the Extended Dual Copy Service (see, col. 19, lines 34-38 of Beal '845). This command sequence includes Request packet, as shown in FIG. 17 (see, col. 19, lines 56-60 of Beal '845) and field 2 of the Request packet specifies local volume (LV) present in devices 109 belonging to DSC105 and field 3 of the Request packet specifies remote volumes present in devices 111 belonging to DSC107 (see, col. 20, line 61 – col. 21, line 13 of Beal '845). For example, if in the command sequence, the host 101 specifies, as a local volume, volume (disk drive) #3 in devices 109 and, as remote volumes, volume (disk drive) #1 in devices 111. Then, upon receipt of the command sequence, DSC 105 takes preparatory actions for the Extended Dual Copy Service so that copy of the write data is held between volume #3 in devices 109 and volume #1 in devices 111. As a result, whenever host 101 issues to DSC 105 a write command addressed to volume #3, DSC 105 transmits write data to DSC 107 so that associated data is written not only in the volume #3 present in drives 109 belonging to DSC105 itself, but also in the volume #1 belonging to DSC107 (see, col. 20, line 61 – col. 21, line 35 of Beal '845).

When an Extended Connectivity service is to be used, it is also necessary for the host 101 to issue a command sequence, as shown in FIG. 14, to DSC 105 so as to instruct preparatory actions for the Extended Connectivity service, as in the case of the Extended Dual Copy service (see, col. 30, lines 36-39 of Beal '845). In the case of the Extended Connectivity service, however, parameters stored in the Request packet are partially different from those in the Extended Dual Copy service. Namely, field 2 specifies phantom volume, unlike the Extended Dual Copy service, in which a local volume is specified as belonging to DSC105. The phantom volume is a volume having no physical entity (see, col. 30, lines 48-51 of Beal '845). As a result, whenever the host 101 subsequently issues to DSC 105 a write request addressed to a phantom volume, DSC 105 transmits write data to DSC 107 so that the associated data may be stored in the remote volume, **not** in drives 109 belonging to DSC 105 (see, col. 30, lines 60-65 of Beal '845).

As discussed above, in using the Extended Connectivity service, host is required to issue a command sequence and specify a local volume (= phantom volume) and a remote volume therein to the storage system. Therefore, when issuing a write command, the host as disclosed by Beal '845, already knows (recognizes) that by specifying a phantom volume in the write command, write data will be stored in a remote volume.

Beal '845 does **not** disclose the manner in which "correlation information" is used to determine a storing destination of write data, and that such "correlation information" used for determining a storing destination of write data is "set in the controller by another [service] processor, and is **not** set by the host computer which issues the write request, as expressly defined in Applicants' base claim 8. Since the

"correlation information" used for determining a storing destination of write data is set in the controller by another [service] processor, and not by the host computer, the host computer needs **not** recognize which storage system write data is going to be stored in accordance with the write request issued. As a result, the first disk controller can advantageously deliver a write request to any of the storage systems transparently with respect to the host computer (namely, without making the host computer aware as to which one of the storage systems the target disk intended by the write request is present).

More importantly, there is **no** disclosure anywhere in Beal '845 of Applicants' claimed "first disk controller" being "configured to receive a write request from [said] host computer, select a storage system including a target disk designated by first disk identification information included in the write request by using said correlation information, obtain, if a selected storage system is said another storage system, identification information designating said another storage system and second disk identification information designating the target disk based on said first disk identification information included in the write request and said correlation information, and send a write request to said another storage system according to said identification information designating said another storage system and said second disk identification information" as expressly defined in Applicants' base claim 8.

The rule under 35 U.S.C. §102 is well settled that anticipation requires that each and every element of the claimed invention be disclosed in a single prior art reference. In re Paulsen, 30 F.3d 1475, 31 USPQ2d 1671 (Fed. Cir. 1994); In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990). Those elements must

either be inherent or disclosed expressly and must be arranged as in the claim. Richardson v. Suzuki Motor Co., 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989); Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 USPQ2d 1057 (Fed. Cir. 1988); Verdegall Bros., Inc. v. Union Oil Co., 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987). The corollary of that rule is that absence from the reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 230 USPQ2d 81 (Fed. Cir. 1986).

In the present situation, Beal '845 fails to disclose and suggest key features of Applicants' base claim 8. Therefore, Applicants respectfully request that the rejection of base claim 8 and its dependent claims 9-12 be withdrawn.

Separately, dependent claim 12 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Beal '845 for reasons stated on pages 8-9 of the Office Action (Paper No. 20040607). As previously discussed, base claim 8 is now deemed patentably distinguishable over Beal '845. As a result, dependent claim 12 should also be deemed patentably distinguishable over Beal '845 by virtue of dependency upon the now allowed claim 8.

Lastly, claims 6-11 have been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of Applicants' earlier issued U.S. Patent No. 6,721,841 for reasons stated on pages 9-10 of the Office Action (Paper No. 20040607). Similarly, claims 1-3 and 6-11 have been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976 for reasons stated on pages 10-11 of the Office Action (Paper No. 20040607). Claims 4-5 have also been rejected under the judicially create

doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Applicants' earlier issued U.S. Patent No. 6,529,976 in view of Beal '845 for reasons stated on pages 11-12 of the Office Action (Paper No. 20040607). Claims 1-3 and 6-11 have also been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129 for reasons stated on page 12 of the Office Action (Paper No. 20040607). Claims 4-5 have also been rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129 in view of Beal '845 for reasons stated on pages 12-13 of the Office Action (Paper No. 20040607). Lastly, claims 6-12 have been provisionally rejected under the judicially create doctrine of obviousness-type double patenting as being unpatentable over claims 11-16 of Applicants' co-pending application Serial No. 10/663,662 for reasons stated on pages 13-14 of the Office Action (Paper No. 20040607). As previously discussed, claims 1-7 have been canceled without prejudice or disclaimer. Claims 8-12, as amended, are believed to contain features that are patentably distinct from that of claims 1-4 of Applicants' earlier issued U.S. Patent No. 6,721,841, claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976, claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129, and claims 11-16 of Applicants' co-pending application Serial No. 10/663,662, in view of Beal '845. However, in the interest of expedition, a terminal disclaimer is submitted herewith to place all claims in condition for allowance. As a result, the filing of such a terminal disclaimer is not, and should not be construed or interpreted as an admission that claims 8-12 as pending in the instant application are not patentably distinct from that of claims 1-4 of Applicants'

earlier issued U.S. Patent No. 6,721,841, claims 4-5 of Applicants' earlier issued U.S. Patent No. 6,529,976, claim 1 of Applicants' earlier issued U.S. Patent No. 6,098,129, and claims 6-9 and 11-12 of Applicants' co-pending application Serial No. 10/663,662 in view of Beal '845. Applicants respectfully reserve all rights to file subsequent related application(s) (including reissue applications) directed to any or all previously claimed limitations/features which have been amended, canceled or disclaimed, or to any or all limitations/features not yet claimed, i.e., Applicants have no intention or desire to dedicate or surrender any limitations/features of the disclosed invention to the public.

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney at the Washington DC area office at (703) 312-6600.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this

Amendment in order to schedule an Examiner interview. Applicants thank the Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.36172VC4), and please credit any excess fees to said deposit account.

Respectfully submitted,

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